For the Public's Health: The Role of Measurement in Action and Accountability

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Committee on Public Health Strategies to Improve Health; Institute of Medicine

Summary

For the Public's Health: The Role of Measurement in Action and Accountability, this first of three reports, builds on earlier Institute of Medicine (IOM) efforts to describe the activities and role of the public health system, which was defined in the 2003 report *The Future of the Public's Health in the 21st Century* (IOM, 2003) as the intersectoral system that comprises the government public health agencies and various partners, including communities, the health care delivery system, employers and business, the media, and academia. In the present report, the system has been redefined as simply "the health system." The modifiers *public* and *population* are poorly understood by most people other than public health professionals and may have made it easier to misinterpret or overlook the collective influence and responsibility that all sectors have for creating and sustaining the conditions necessary for health. In describing and using the term *the health system,* the committee seeks to reinstate the proper and evidence-based understanding of health as not merely the result of medical or clinical care but the result of the sum of what we do as a society to create the conditions in which people can be healthy (IOM, 1988).

The committee's charge in preparing this report was to "review population health strategies, associated metrics, and interventions in the context of a reformed health care system. The committee will review the role of score cards and other measures or assessments in summarizing the impact of the public health system, and how these can be used by policy-makers and the community to hold both government and other stakeholders accountable

and to inform advocacy for public health policies and practices."[1] At the committee's first meeting, the sponsor clarified the intent of the reference to the "public health system" to mean the multisectoral system described in the 2003 IOM report rather than the government public health infrastructure alone (IOM, 2003).

This report is the committee's response to its first task and hence focuses on measurement and on the US health statistics and information system, which collects, analyzes, and reports population health data, clinical care data, and health-relevant information from other sectors. However, data and measures are not ends in themselves, but rather tools to inform the myriad activities (programs, policies, and processes) developed or undertaken by governmental public health agencies and their many partners, and the committee recognizes that its later reports on the law and funding will complete its examination of three of the key drivers of population health improvement.

The committee finds that the United States lacks a coherent template for population health information that could be used to understand the health status of Americans and to assess how well the nation's efforts and investments result in improved population health. The committee recommends changes in the processes, tools, and approaches used to gather information on health outcomes and to assess accountability. This report contains four chapters that offer seven recommendations relevant to public health agencies, other government agencies, decision-makers and policy-makers, the private sector, and the American public.

The national preoccupation with the cost of clinical care evident in the lead-up to the passage of the Affordable Care Act of 2010 is well founded, and changes in the system's pricing, labor, processes, and technology are essential and urgent (see Chapter 1). However, improving the clinical care delivery system's efficiency and effectiveness will probably have only modest effects on the health of the population overall in the absence of an ecologic, population-based approach to health improvement. Unhealthy communities and unfavorable socioeconomic environments will continue to facilitate unhealthy choices and unhealthy environments.

The expected reform of the clinical care delivery system and the committee's understanding of the centrality of socioenvironmental determinants of health led it to view measures of health outcomes (often presented as indicators for public or policy-maker consumption and conveying statistical data directly or in a composite form) as serving three primary functions:

[1] Although the committee uses *clinical care system* in the report to refer to the health care or medical care delivery system, the language in this quotation comes directly from the sponsor's charge to the committee, so it was not changed.

- To provide transparent and easily understood information to members of communities and the public and private entities that serve them about health and the stakeholders that influence it locally and nationally.
- To galvanize and promote participation and responsibility on the part of the public and institutional stakeholders (businesses, employers, community members, and others) that have roles to play in improving population health.
- To foster greater accountability for performance in health improvement on the part of government health agencies, other government entities whose portfolios have direct bearing on the health of Americans, and private-sector and nonprofit-sector contributors to the health system.

The committee believes that analysis and use of health and relevant nonhealth data and measures are a necessary complement to and facilitator of other efforts in the transformation to healthier people, healthier community environments, and a strong, competitive national economy. Achieving those outcomes relies on an integration and building of synergy between the best evidence-based interventions at the population level and in the clinical setting. Measurement of health outcomes and performance can spur change—as demonstrated by communities that have been able to "move the needle" in their own local efforts to improve the conditions for health and in the clinical care system's efforts to improve quality.

More complete, useful, timely, and geographically pertinent information is a necessary but not sufficient ingredient to facilitate heightened community engagement and improved performance by various stakeholders in the health system, defined as encompassing the "activities undertaken within the formal structure of government and the associated efforts of private and voluntary organizations and individuals" (IOM, 1988, 2003).

In Chapter 1, the committee constructs its case for change that will lead to a transformed health statistics and information system and to a more concrete framework for placing measurement in the service of accountability. The committee's case includes an overview of the literature on the determinants of health and implications for the issues discussed in the remainder of the report.

In Chapter 2, the committee discusses the national health statistics and information enterprise. That enterprise is large and productive, but it lacks optimal coordination, it has gaps that impede its contributions to understanding of and improvement in population health outcomes, it does not shed sufficient light on the relevance of the determinants of health nationally or in communities, and it does not sufficiently inform about how the nation or communities can achieve improvements in health apart from

those provided by traditional public health programs and by clinical care. For example, such health outcomes as infant mortality and cardiovascular disease expose the limits of a national health strategy that directs the vast majority of its resources toward change in the clinical care delivery system without equally aggressive attacks on the loci of conditions that lead to the adoption of unhealthy behaviors and creation of unhealthy environments. Without understanding and acting on those important conditions that can improve people's ability to live healthy lives, the United States will continue to incur needless clinical care costs, and the health of the population will fall further behind that of other nations.

In Chapter 3, the committee offers a series of recommendations to address the challenges described in Chapter 2, beginning with a transformation of the nation's primary health statistics agency. The transformation, the committee believes, has the potential to improve system-wide coordination and capacity to ensure that needed data are available to health-system partners. That is, to ensure that the best evidence is built through research and modeling to facilitate effective, efficient, and equitable actions to improve population health. The chapter's other recommendations are for the development and adoption of three types of measures that could better inform the public, decision-makers, public health practitioners, and their many partners about health outcomes and their determinants; an annual report on the socioeconomic determinants of health; modeling for predictive and systems use; data-sharing between public health agencies and medical care organizations; and public health agency reporting on clinical care performance pertinent to population health.

In Chapter 4, the committee uses the lens of measurement to examine and discuss system performance. It reviews the responsibilities of all stakeholders in the health system and outlines a framework for defining accountability and holding stakeholders accountable for the contributions they can make to population health. At the end of the chapter, the committee envisions what could happen in a transformed, high-performance health system in which the capacities of local laws, workplace policies, business decisions, clinical encounters, and public participation are harnessed to achieve marked gains in two exemplar health outcomes in individuals and communities: infant mortality and cardiovascular disease.

RECOMMENDATIONS

The committee finds that at all levels of American life—including local, state, and national—decision-makers lack sufficient information to make important choices about the health of their communities. That is due in part to the lack of sufficient coordination, integration, coherence, and capacity of the complex, multisectoral health statistics and information

enterprise that generates, analyzes, and translates pertinent information for decision-makers and the public. The report's first recommendation proposes a solution.

Recommendation 1
The committee recommends that:

1. **The Secretary of Health and Human Services transform the mission of the National Center for Health Statistics to provide leadership to a renewed population health information system through enhanced coordination, new capacities, and better integration of the determinants of health.**
2. **The National Prevention, Health Promotion, and Public Health Council include in its annual report to Congress on its national prevention and health-promotion strategy an update on the progress of the National Center for Health Statistics transformation.**

The committee finds that the nation's population health statistics and information enterprise lacks three types of measures that could support the information needs of policy-makers, public health officials, health system partners, and communities. These are: a standardized set of measures that can be used to assess the intrinsic health of communities in and of themselves; a standardized set of health outcome indicators for national, state, and local use; and a summary measure of population health that can be used to estimate and track health-adjusted life expectancy (HALE)[2] for the United States. To elaborate on each of the measures, despite a long history of efforts to develop and implement the summary measure of population health in national data sets, such as National Center for Health Statistics (NCHS) surveys and the Healthy People objectives, no summary measure appropriate for calculating HALE has been adopted for routine use by federal agencies. Also, there currently is no coordinated, standard set of true measures of a community's health—not aggregated information about the health of individuals residing in a community, but rather measures of green space, availability of healthy foods, land use and zoning practices that are supportive of health, safety, social capital, and social cohesion, among many other determinants of health. Finally, the committee notes a proliferation of health outcome indicator sets (measures of distal health

[2] A definition of health-adjusted life expectancy (HALE): "Year-equivalents of full health that an individual can expect to live if exposed at each age to current mortality and morbidity patterns. Years of less than full health are weighted according to severity of health conditions. The HALE calculation modifies a standard life expectancy calculation by weighting the number of life years lived by each age group using the mean health state score for that age group" (Statistics Canada, 2006). Additional discussion of HALE and of summary measures of population health is provided in Chapter 3.

outcomes such as disease rates and disease-specific death rates), some of high quality, and all designed for different purposes but with a degree of overlap and the potential to cause confusion among decision-makers. The committee was not constituted to and did not endeavor to develop lists of proposed indicators. The process of developing and reaching evidence-based consensus on standardized indicator sets will require considerable research, broad-based discussion (involving all relevant parties), and priority-setting to come up with parsimonious sets. Research would include modeling and other efforts to elucidate the linked nature of many determinants of health and intermediate indicators of health. Clarifying those relationships can lead to development of useful measures at all geographic levels. A national effort toward such elucidation may initially require defining a modest core set that all localities would be encouraged to use (for example, to support comparisons and allow "rolling up" from the local to the state and even national levels); additional optimal indicators could be identified for other outcomes or community characteristics of interest to particular localities.

Recommendation 2

The committee recommends that the Department of Health and Human Services support and implement the following to integrate, align, and standardize health data and health-outcome measurement at all geographic levels:

a. A core, standardized set of indicators that can be used to assess the health of communities.

b. A core, standardized set of health-outcome indicators for national, state, and local use.[3]

c. A summary measure of population health that can be used to estimate and track health-adjusted life expectancy for the United States.

Ideally, the development of the indicators described above will be conducted with advice from a fully resourced and strengthened NCHS (see Recommendation 1) and input from other relevant stakeholders, including other agencies and organizations that collect, analyze, and report data; community-level public health practitioners; and the public health research community.

Because the summary measure of population health in part (c) would serve as a marker of the progress of the nation and its communities in improving health, it should be implemented in data-collection and public-communication efforts at the federal level (such as the periodic Healthy

[3] The conception of a community may differ from one context to another, and it could range from a neighborhood to a county. Local decision-makers may include mayors, boards of supervisors, and public health officials. The notion of local may also vary (from census tract or ZIP code to city or county) depending on planning or research objectives and many other factors.

People effort, which as discussed in Chapter 3 has attempted to include such a summary measure in the past) and at state and local levels. The committee believes that public officials need to take steps to educate Americans with respect to the meaning of summary measures of population health and their linkage to determinants that are amenable to action at individual and societal levels. Promotion of and education on the summary measure of population health will be needed if it is to can gain traction as a key marker of the progress of the nation and its communities in improving health.

Many commentators in the field have expressed great expectations about the potential of health-information technology, such as electronic health records, to inform population health activities and public health practice, and the Affordable Care Act calls for investment to inform public health and population health data-gathering. However, great care is needed to ensure that new investment meets all the stated goals, is not used largely to maximize the use and usefulness of clinical care data in the care delivery system in isolation from population health stakeholders, and gives high priority to accuracy and safeguarding of confidentiality and privacy.

Despite broad recognition in health circles of the vital importance of nonclinical determinants of health in shaping population health, the committee has found that the United States does not have a centralized federal comprehensive annual report that highlights and tracks progress on the root causes of poor health at the population level. A newly strengthened and adequately resourced NCHS may be well suited to assume that responsibility.

Recommendation 3
The committee recommends that the Department of Health and Human Services produce an annual report to inform policy-makers, all health-system sectors, and the public about important trends and disparities in social and environmental determinants that affect health.

The committee was asked to consider the implications of health care reform for population health and for the public health infrastructure in the context of measurement. It is unclear what effects the Affordable Care Act will have on public health agencies' role in the delivery of clinical services. However, the committee found that the Affordable Care Act's emphasis on prevention and its other population health–oriented provisions offer an opportunity to consider ways to integrate clinical care and public health efforts to contribute to improving population health.

Both clinical care and public health stakeholders need to benefit from the data-sharing relationship. For example, clinicians need easier access to the data that they submit to government entities, access to analyses to help them to improve the appropriateness of the care they deliver, and access to

other population health data (such as disparities and determinants) pertinent to the health status of the communities they serve and how they compare with the larger population so that they can tailor clinical care, outreach, and community services to meet needs better and improve outcomes. Similarly, clinical care system data have been shown to be an important source of syndromic surveillance information for infectious diseases, small-area health data, and service use patterns to inform population health efforts, including filling gaps in data available from other sources (NCVHS, 2010).

Recommendation 4
The committee recommends that governmental public health agencies partner with medical care organizations and providers in their jurisdictions to share information[4] derived from clinical-data sources, when appropriate, to inform relevant population health priorities. Such information will support core health indicators that are otherwise unavailable at some or all geographic levels.

The committee also believes that public health agencies can play an important role in reporting to the public on clinical care system performance. They already do to some extent in various states and jurisdictions with regard to specific services and care settings. There are important concerns about confidentiality and privacy that must be weighed along with the value of open disclosure and analysis. However, much more could be communicated to the public in an easy-to-understand format and in the context of a broader effort to inform and educate the public about effectiveness and efficiency in clinical care and to improve patients' decision-making.

Recommendation 5
The committee recommends that state and local public health agencies in each state collaborate with clinical care delivery systems to assure that the public has greater awareness of the appropriateness, quality, safety, and efficiency of clinical care services delivered in their state and community. Local performance reports about overuse, underuse, and misuse should be made available for selected interventions (including preventive and diagnostic tests, procedures, and treatment).

Chapter 2 highlights both the extraordinary capabilities of the population health statistics and information available to support population health

[4] Information shared will generally be deidentified and aggregated. In some circumstances, however, the data are and must be tracked individually (for example, for infectious-disease reporting and immunization-registry purposes). Variations in local needs and public health authority may lead to other types of data-use agreements.

improvement activities and the substantial gaps that remain. Gaps include an understanding of some of the more recently conceptualized and studied complex causal and interrelated pathways to health outcomes, such as the contributions of social cohesion. The gaps make the work of decision-makers and communities more difficult because they lack information needed to support policy-making, health-needs priority-setting, resource allocation, and other aspects of planning. The committee believes that an array of modeling techniques can help to fill knowledge gaps, advance the state of the science, and provide better and more timely information to decision-makers and stakeholders.

Recommendation 6
The committee recommends that the Department of Health and Human Services (HHS) coordinate the development and evaluation and advance the use of predictive and system-based simulation models to understand the health consequences of underlying determinants of health. HHS should also use modeling to assess intended and unintended outcomes associated with policy, funding, investment, and resource options.

The committee concludes that an accountability framework is needed that includes (1) reaching agreement among health-system stakeholders and those holding them accountable on specific plans of action for targeting health priorities; (2) holding implementing agencies or stakeholders accountable for execution of the agreed-on plans; and (3) measuring execution and outcomes and agreeing on a revised plan of action (an iterative loop). Chapter 4 highlights two types of accountability: contract accountability, referring to the financial and statutory relationships between government public health agencies (and to a smaller extent nonprofit public health organizations) and their funders; and compact accountability (or mutual accountability), referring to the agreement-based relationships among other stakeholders and with the community.

Recommendation 7
The committee recommends that the Department of Health and Human Services work with relevant federal, state, and local public-sector and private-sector partners and stakeholders to

1. **Facilitate the development of a performance-measurement system that promotes accountability among governmental and private-sector organizations that have responsibilities for protecting and improving population health at local, state, and national levels. The system should include measures of the inputs contributed by those organizations (e.g., capabilities, resources, activities, and**

programs) and should allow tracking of impact on intermediate and population health outcomes.

2. **Support the implementation of the performance measurement system by**
   a. **Educating and securing the acceptance of the system by policy-makers and partners.**
   b. **Establishing data-collection mechanisms needed to construct accountability measures at appropriate intervals at local, state, and national levels.**
   c. **Encouraging early adoption of the system by key government and nongovernmental public health organizations and use of the system for performance reporting, quality improvement, planning, and policy development.**
   d. **Assessing and developing the necessary health-system capacity (e.g., personnel, training, technical resources, and organizational structures) for broader adoption of the framework, including specific strategies for steps to address nonperformance by accountable agencies and organizations.**

Strategies to address nonperformance could (depending on the stakeholder) range from technical assistance, training, and mentorship to direct oversight and assumption of responsibilities and from consolidation with other jurisdictions (or regionalization) to pooling of resources or sharing of specific resources and expertise to increase agency capacity and meet performance standards to ensure that every person in every jurisdiction has access to a full set of public health services. Such strategies would be applied in a stepwise fashion that builds capacity locally and improves the health of the community.

CONCLUSION

The first decade of the 21st century has been an extremely active and productive time for health-outcome and other types of indicators. Multiple organizations have drawn on federal and other government data to derive or develop myriad indicators of the various dimensions of population health—from distal outcomes to underlying and intermediate causal factors. However, the proliferation of indicator sets (varied in quality and purpose) has the potential to create confusion and further fragmentation in a field that is already splintered among numerous public, private, and nonprofit producers, translators, conveyors, and users of data.

The committee has examined the role of data and indicators in informing action and creating accountability and has offered recommendations

that if implemented can lead to a more coherent, efficient, and useful health information system. The changes and challenges of the future, ranging from an aging population to economic hardship, require a system that fully integrates the determinants of health perspective into its instruments and methods, that uses the benefits of new technologies to their fullest advantage to increase efficiency and maximize resources, and that builds information bridges among sectors. Finally, the health information system must be intensely focused on the needs of end users (communities and decision-makers at all geographic levels), engaging them in the evolution of efforts toward coherence, standardization, and rationalization of a measurement capacity that advances the health of the public.

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FOR THE PUBLIC'S HEALTH

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Committee on Public Health Strategies to Improve Health

Board on Population Health and Public Health Practice

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The serpent has been a symbol of long life, healing, and knowledge among almost all cultures and religions since the beginning of recorded history. The serpent adopted as a logotype by the Institute of Medicine is a relief carving from ancient Greece, now held by the Staatliche Museen in Berlin.

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"Knowing is not enough; we must apply.
Willing is not enough; we must do."
—Goethe

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This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the National Research Council's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We wish to thank the following individuals for their review of this report:

Edward Baker, University of North Carolina at Chapel Hill
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Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations nor did they see the final draft of the report before its release. The review of this report was overseen by **Lawrence D. Brown**, University of Pennsylvania, and **Jo Ivey Boufford**, New York University. Appointed by the National Research Council and the Institute of Medicine, they were responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authoring committee and the institution.

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The committee learned a great deal about measurement of health from representatives of federal, state, and local public health agencies and from researchers and many types of practitioners who presented at the committee's information-gathering meetings pertaining to the present report. The meeting agendas provided in Appendix C include the names of all the speakers.

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Contents

Preface: Introduction to the Series of Reports

In 2009, the Robert Wood Johnson Foundation asked the Institute of Medicine (IOM) to convene a committee to examine three topics in relation to public health: measurement, the law, and funding. The committee's complete three-part charge is provided in Box P-1. The IOM Committee on Public Health Strategies to Improve Health explored the topics in the context of contemporary opportunities and challenges and with the prospect of influencing the work of the health system (broadly defined as in the report summary) in the second decade of the 21st century and beyond. The committee was asked to prepare three reports—one on each topic—that contained actionable recommendations for public health agencies and other stakeholders that have roles in the health of the US population. This report is the first in the series.

The committee's three tasks and the series of reports prepared to respond to them are linked by the recognition that measurement, laws, and funding are three major drivers of change in the health system. Measurement (with the data that support it) helps specialists and the public to understand health status in different ways (for example, by determinant or underlying cause where national, local, and comparative evidence is available), to understand the performance of the various stakeholders in the system, and to understand the health-related results of investment. Measurement also helps communities to understand their current status, to determine whether they are making progress in improving health, and to set priorities for their next actions. Although the causal chains between actions of the health system and health outcomes are not always clearly elucidated, measurement is a fundamental requirement for the reasons listed above.

BOX P-1
Charge to the Committee

Task 1 (accomplished in this report)
The committee will review population health strategies, associated metrics, and interventions in the context of a reformed health care system. The committee will review the role of score cards and other measures or assessments in summarizing the impact of the public health system, and how these can be used by policy-makers and the community to hold both government and other stakeholders accountable and to inform advocacy for public health policies and practices.

Task 2 (to be addressed in a forthcoming report)
The committee will review how statutes and regulations prevent injury and disease, save lives, and optimize health outcomes. The committee will systematically discuss legal and regulatory authority; note past efforts to develop model public health legislation; and describe the implications of the changing social and policy context for public health laws and regulations.

Task 3 (to be addressed in a forthcoming report)
The committee will develop recommendations for funding state and local health systems that support the needs of the public after health care reform. Recommendations should be evidence based and implementable. In developing their recommendations the committee will:

- Review current funding structures for public health
- Assess opportunities for use of funds to improve health outcomes
- Review the impact of fluctuations in funding for public health
- Assess innovative policies and mechanisms for funding public health services and community-based interventions and suggest possible options for sustainable funding.

Laws transform the underpinnings of the health system and also act at various points in and on the complex environments that generate the conditions for health. Those environments include the widely varied policy context of multiple government agencies, such as education and transportation agencies, and many types of legal or legislative measure intended to reshape the factors that improve or impede health. The measures range from national tobacco policy to local smoking bans and from national agricultural subsidies and school nutrition standards to local school-board decisions about the types of foods and beverages to be sold in school vending machines.

Funding that supports the activities of public health agencies is provided primarily by federal, state, and local governments. However, government budgets must balance a variety of needs, programs, and policies, and the

budgets draw on different sources (including different types of taxes and fees), depending on jurisdiction. Therefore, the funds allocated to public health depend heavily on how the executive and legislative branches set priorities. Other funding sources support public health activities in the community, including "conversion" foundations formed when nonprofit hospitals and health insurers became privatized (such as the California Wellness Foundation). Additionally, funds for population health and medical care activities may be provided by community-based organizations with substantial resources, not-for-profit clinical care providers, and stakeholders in other sectors.

The subjects addressed in the three reports are not independent of each other and often affect one another. For example, measurement of health outcomes and of progress in meeting objectives can provide evidence to guide the development and implementation of public health laws and the allocation of resources for public health activities. Laws and policies often require the collection of data and can circumscribe the uses to which the data are put (for example, prohibiting access to personally identifiable health information). Similarly, statutes can affect funding for public health through such mechanisms as program-specific taxes or fees. And laws shape the structure of public health agencies, grant them their authority, and influence policy.

In the three reports, the committee will make a case for increased accountability of all sectors that affect health—including the clinical care delivery system, the business sector, academe, nongovernment organizations, communities, and various government agencies—with coordination by the government public health infrastructure. The present report reflects the committee's thinking about how accountability would look at local, state, and national levels[1] and suggests measurement strategies that would heighten accountability and galvanize broader action by communities and other stakeholders. In later reports, the committee will review legal and regulatory strategies that heighten public and private responsibilities and, in the final report, will consider resource needs and approaches to addressing them in a sustainable manner to ensure a robust population health system.

[1] The committee's discussion about measurement framework for accountability may also apply to territorial and tribal government, although this is not explicitly stated.